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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MORAN, TIMOTHY J	
ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 07/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/844,171

Applicant(s)

SCHIMERT ET AL.

Examiner

Timothy J. Moran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 20-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-19 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DOCUMENT HANDLING ISSUES

The papers filed on May 6, 2002 (certificate of mailing dated April 23, 2002) have not been made part of the permanent records of the United States Patent and Trademark Office (Office) for this application (37 CFR 1.52(a)) because of damage from the United States Postal Service irradiation process. The above-identified papers, however, were not so damaged as to preclude the USPTO from making a legible copy of such papers. Therefore, the Office has made a copy of these papers, substituted them for the originals in the file, and stamped that copy:

COPY OF PAPERS ORIGINALLY FILED

If applicant wants to review the accuracy of the Office's copy of such papers, applicant may either inspect the application (37 CFR 1.14(d)) or may request a copy of the Office's records of such papers (*i.e.*, a copy of the copy made by the Office) from the Office of Public Records for the fee specified in 37 CFR 1.19(b)(4). Please do **not** call the Technology Center's Customer Service Center to inquiry about the completeness or accuracy of Office's copy of the above-identified papers, as the Technology Center's Customer Service Center will **not** be able to provide this service.

If applicant does not consider the Office's copy of such papers to be accurate, applicant must provide a copy of the above-identified papers (except for any U.S. or foreign patent documents submitted with the above-identified papers) with a statement that such copy is a complete and accurate copy of the originally submitted documents. If applicant provides such a copy of the above-identified papers and statement within **THREE MONTHS** of the mail date of this Office action, the Office will add the original mailroom date and use the copy provided by applicant as the permanent Office record of the above-identified papers in place of the copy made by the Office. Otherwise, the Office's copy will be used as the permanent Office record of the above-identified papers (*i.e.*, the Office will use the copy of the above-identified papers made by the Office for examination and all other purposes). This three-month period is not extendable.

DETAILED ACTION

Election/Restrictions

This application contains claims directed to the following patentably distinct species of the claimed invention: an infrared detector with a sensing portion which has a configuration providing a resistance selected independently of a temperature coefficient of resistance, and an infrared detector with a thermal absorber portion which is made of an aluminum-titanium alloy.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 4 is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record

showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with T. Murray Smith on July 8, 2002 a provisional election was made with traverse to prosecute the invention of an infrared detector with a sensing portion which has a configuration providing a resistance selected independently of a temperature coefficient of resistance, claims 1-3 and 5-19. Affirmation of this election must be made by applicant in replying to this Office action. Claims 20-27 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

The drawings are objected to under 37 CFR 1.83(a) because they fail to show the following elements as described in the specification: "142" and "143" (page 21, line 33), and "146" (page 22, line 4). Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to

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the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: In page 21, line 22, the term "11-11" should be replaced with "15-15."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 2 and 17 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is well known in the art of silicon devices that the resistivity of amorphous silicon depends strongly on its doping characteristics (see Villain, U. S. Patent No. 5,912,464, col. 8, lines 31-46). Therefore one skilled in the art would not have sufficient guidance to fabricate an apparatus where the resistance is substantially independent of doping level, as described in claim 2, lines 8-9 and claim 17, lines 8-9.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6, 7, 10, 11, 13, 14, and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Villain, U. S. Patent No. 5,912,464. Regarding claim 1, Villain describes an apparatus comprising an infrared detector with a plurality of elements (col. 3, lines 52-56) that each include an amorphous silicon portion (element 14, fig. 2A, col. 4, lines 25-30 and col. 3, lines 31-34) with a selected temperature coefficient of resistance, and first and second electrodes (elements 13 and 13', col. 4, lines 13-17), where the resistance of the structure is determined by the configuration and resistivities of the various materials, independent of the temperature coefficient of resistance.

Regarding claim 2, Villain teaches that the amorphous silicon portion can be doped to provide a selected temperature coefficient of resistance (col. 8, lines 31-46), and that the resistance of the structure is determined by the configuration and resistivities of the various materials.

Regarding claim 3, Villain teaches that the electrodes (13 and 13') are in thermal communication with the amorphous silicon portion (14) and that they absorb thermal energy (col. 9, lines 64-67).

Regarding claim 6, Villain teaches that the infrared detector includes an integrated circuit (col. 14, lines 38-49), a membrane (fig. 3A and fig. 3B) having an amorphous silicon portion and electrodes, and structure which supports said membrane above said integrated circuit and couples the electrodes to said integrated circuit.

Regarding claim 7, Villain teaches that the integrated circuit has thereon a reflective surface (fig. 8A and 8B, element 21, col. 14, line 63-col. 15, line 3), wherein a distance between said reflective surface and said membrane is selected to form a resonant cavity (col. 10, lines 19-30, col. 11, lines 8-10, and col. 13, lines 54-58).

Regarding claim 10, Villain teaches (fig. 2A) that both electrodes (13 and 13') are on the same side of the amorphous silicon portion (14).

Regarding claim 11, Villain teaches (fig. 3B) that the electrodes have interdigitated fingers.

Regarding claim 13, Villain teaches (element 32, fig. 16, col. 16, lines 13-23) that first and second electrically insulating layers (silicon nitride) can be fabricated above (eleventh step) and below (adjacent to polyimide) the amorphous silicon layer and electrodes. Note that the limitation "substantially transparent to infrared radiation" is implied by the statement that the reflective surface below the membrane reflects a substantial amount of infrared radiation (col. 10, lines 19-30).

Regarding claim 14, Villain teaches (fig. 1A) that the amorphous silicon portion can be a layer (14) having two electrodes (13 and 13') on opposite sides thereof in alignment with each other.

Regarding claims 16-18, the methods described are inherently implied in the use of the apparatus described in claims 1-3.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Villain as applied to claim 3 above, and further in view of Kimura, U. S. Patent No. 5,589,688. Regarding claim 4, Villain does not teach that the electrodes are made from an alloy which includes aluminum and titanium. However, Kimura describes (fig. 2) an infrared radiation sensor with a thermally sensitive silicon portion (element 1) and electrodes (5) made from an alloy of aluminum and titanium (col. 6, lines 5-6 and col. 9, lines 44-48). Therefore it would have been obvious to one of ordinary skill in the art to provide for electrodes made from such an alloy in the apparatus of Villain for the benefit of electrical connection to the thermally sensitive portion.

Regarding claim 5, Kimura does not specify a composition range for the aluminum-titanium alloy. However, since both are well known to be good conductors, it is considered reasonable to use an alloy which includes approximately equal amounts

of aluminum and titanium. Therefore it would have been obvious to one of ordinary skill in the art to use such an alloy in the modified apparatus of Villain for the benefit of electrical connection to the thermally sensitive portion.

Claims 8, 9, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Villain as applied to claim 7 above, and further in view of Agnese, U. S. Patent No. 5,825,029. Regarding claim 8, Villain does not teach that the membrane has a plurality of openings. However, Agnese describes (fig. 3 and fig. 4) a infrared sensing apparatus comprising a membrane (12) comprising a thermally sensitive portion (16) in contact with electrodes (22 and 24, col. 3, lines 17-30), where the membrane has a plurality of openings for the advantage of better absorbing infrared radiation. Therefore it would have been obvious to one of ordinary skill in the art to provide for a plurality of openings in the membrane of Villain for the advantage of better absorbing infrared radiation.

Regarding claim 9, Agnese teaches that the spacing of the grid openings have a length equivalent to half the wavelength of interest (col. 5, lines 5-8), and that the distance between the membrane and the cavity bottom should be equal to one quarter of the wavelength of interest (col. 4, lines 3-7). Therefore it would have been obvious to provide for openings with a transverse dimension approximately twice the distance between the reflective surface and the membrane in the modified apparatus of Villain for the advantage of better absorbing infrared radiation.

Regarding claim 19, the methods described are inherently implied in the use of the apparatus of claim 8.

Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Villain. Villain does not explicitly teach that the insulating layers described in (col. 16, lines 13-23) should be used with the apparatus shown in fig. 1A and described in claim 14. However, these layers serve as protection against passivation, and would therefore be useful in the apparatus of fig. 1A also. Therefore it would have been obvious to provide for insulating layers surrounding the amorphous silicon layer and electrodes in the apparatus of Villain (fig. 1A) for the benefit of protection against passivation.

Allowable Subject Matter

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Claim 12 includes limitations that the apparatus includes a third electrode positioned on a side of the amorphous silicon layer opposite from the first and second electrodes.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Moran whose telephone number is 703-305-0849. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 703-308-4881. The fax phone numbers for

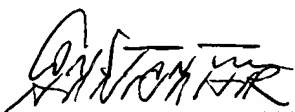
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the organization where this application or proceeding is assigned are 703-308-7724 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

T.M.

TM
July 10, 2002


CONSTANTINE HANNAHER
PRIMARY EXAMINER
GROUP ART UNIT 2878